Sport Physiotherapists' Perceptions of Psychological Strategies in Sport Injury Rehabilitation

Alana Ninedek and Gregory S. Kolt

Context: Recent literature has focused on the role of physiotherapists in addressing psychological sequelae of sport injury and rehabilitation.

Objective: The study investigated sports physiotherapists' views of psychological characteristics that distinguished athletes who cope well with injury from those who cope poorly. Physiotherapists' opinions on the role of psychological skills in rehabilitation were also examined.

Design: A questionnaire-based study.

Participants: Participants were 150 physiotherapists who had completed, or were completing, a postgraduate sports physiotherapy program.

Main Outcome Measures: The test instrument used was the Sports Physiotherapists' Views on Psychological Strategies questionnaire (adapted from Wiese et al[1]).

Results: The physiotherapists reported communication skills, a positive attitude, intrinsic motivation, and realistic goal setting as important aspects of effective rehabilitation.

Conclusions: The findings are discussed in relation to physiotherapists' roles in addressing basic psychological aspects of injury.

Key Words: coping, treatment, education

Ninedek A, Kolt GS. Sport physiotherapists' perceptions of psychological strategies in sport injury rehabilitation. *J Sport Rehabil.* 2000;9:191-206. © 2000 Human Kinetics Publishers, Inc.

In recent times, sport participation and training intensities have dramatically increased,[2] resulting in a greater potential for, and incidence of, physical injury.[3] The costs associated with rehabilitating an injured athlete, the loss of sport and work participation time, the risk of long-term disability, and the consequent reduced quality of life are major public health concerns. Consequently, authorities such as the World Health Organization[4] have emphasized the importance of continuing research on athletic injury.[5]

A major goal of sport injury rehabilitation is to return injured athletes to their prior level of functioning by treating their overt physical problems. In the past, this has been the principal focus of physiotherapy management,[6] but the current literature highlights an increasing trend toward

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treating athletes more holistically, with greater emphasis on the psychological consequences of injury and recovery.

Although some athletes psychologically adapt to injury quite effectively, there appear to be many individuals who experience negative emotional responses after sustaining a sport-related injury.[7,12,13] For example, Pearson and Jones[13] reported that athletes surveyed in their study showed negative emotions such as frustration, depression, tension, anger, and irritability after incurring an injury. Furthermore, it has been reported that the severity of injury can affect the psychological responses experienced during the recovery period. Smith et al[14] reported that athletes with more serious injuries displayed significantly greater levels of frustration, depression, and anger than did athletes with less severe injuries. In addition, Gordon et al[15] suggested that personal variables (eg, personality, past injury experience, pain tolerance) could influence an individual's psychological response to injury.

Athletes who experience negative emotional responses to injury often encounter prolonged or problematic rehabilitation.[3,4,5] This effect on rehabilitation could be a direct result of inadequate coping skills or a result of detrimental behavior such as poor adherence to rehabilitation programs.[16]

The sport psychologist is possibly the best-trained member of the sports-medicine team to address an athlete's postinjury emotional responses.[2,17] Nonetheless, access to a sport psychologist is often limited or unavailable in clinical settings,[18-20] and in circumstances in which sport psychology services are available, many athletes are reluctant to accept formal psychological help.[21]

Because physiotherapists are closely involved with injured athletes during rehabilitation, it has been suggested that they might be suited to provide some form of psychological assistance.[1,17,18] This potential involvement raises the issue of the willingness and ability of these individuals to deliver appropriate services.

Several studies have examined attitudes of sport injury rehabilitation personnel toward providing psychological assistance to injured athletes.[1,17,18,19,20,22] In an early investigation, Wiese et al[1] surveyed athletic trainers in the United States with regard to the extent to which they perceived psychological principles as important to sport injury rehabilitation. The athletic trainers in the Wiese et al study indicated that, compared with athletes who coped poorly with injury, those who coped most successfully had a willingness to listen, a positive attitude, intrinsic motivation, and a willingness to learn about the injury and rehabilitation techniques. The athletic trainers perceived good interpersonal communication skills, positive reinforcement, coach support, keeping the athlete involved with the team, and providing realistic time lines to full recovery as the best psychological strategies to assist injury rehabilitation. Furthermore, the athletic trainers reported that knowing how to use a positive and sincere communication style, knowing how to set realistic goals, knowing how to encour-

age positive self-thoughts, understanding individual motivation, and knowing how to enhance self-confidence were important to them when working with injured athletes. The Wiese et al findings, however, must be considered in light of the fact that only a small proportion (22.6%) of the sample were qualified athletic trainers practicing in a full-time capacity at the time of the survey.

In a more recent study, Francis et al[11] surveyed the opinions of Australian physiotherapists on the role of psychological principles in sport injury rehabilitation. Using the same instrument as Wiese et al,[1] they reported findings similar to those of the earlier study. That is, physiotherapists perceived athletes who coped most successfully with injury as being willing to listen to the physiotherapist, having a positive attitude, being willing to learn about the injury and rehabilitation process, and being self-motivated. They also reported that good communication skills, establishing a realistic recovery time line, and coach support of the athlete were the most effective strategies to facilitate psychological coping with injury. Finally, the physiotherapists in the Francis et al study indicated that it was important to have knowledge about setting realistic goals; using a positive, sincere communication style; understanding individual motivation; and understanding stress and anxiety. Although the Francis et al findings support those of earlier research, it should be noted that they were based on a response rate of less than 50% and that only 4 of the 57 participants had undertaken formal postgraduate training in the area of sports physiotherapy.

In light of the limited literature in this area, and the fact that "sports physiotherapists" have not truly been represented in surveys on the extent to which psychological principles are applied to sport injury rehabilitation, the current study was carried out. The main aim of the study was to assess the opinions of sports physiotherapists (ie, those who had completed or were undertaking formal postgraduate study in sports physiotherapy) on the characteristics of athletes who coped well with injury and rehabilitation, the value of psychological strategies in facilitating coping with injury rehabilitation, and the importance of having knowledge of psychological techniques when treating injured athletes. A further aim was to investigate differences in sports physiotherapists' opinions on the importance of psychological strategies in rehabilitation, based on their clinical experience and training in applied sport psychology.

Methods

Participants

The participants (see Table 1) were 150 physiotherapists (78 men and 72 women) who held postgraduate qualifications in sports physiotherapy or were currently enrolled in postgraduate sports physiotherapy programs at Australian universities. The physiotherapists ranged in age from 26 to

Table 1 Profiles of the Overall Sample and of Men and Women Physiotherapists, Mean (SD)

	Total Sample (N = 150)	Men (n = 78)	Women (n = 72)
Age (y)	36.1 (6.4)	36.7 (6.7)	35.3 (6.0)
Experience as a physiotherapist (y)	13.0 (6.1)	13.2 (6.3)	12.7 (4.6)
Experience since completing postgraduate sports physiotherapy program (y)	4.3 (4.5)	3.7 (4.1)	4.9 (4.6)
Sport psychology training in postgraduate sports physiotherapy program (h)	19.1 (16.1)	17.5 (13.9)	20.3 (18.1)
Physiotherapy treatment per week (h)	39.4 (13.3)	44.7 (9.7)	33.6 (14.3)

58 (mean = 36.1, SD = 6.4) years. They reported having a mean of 13.0 (SD = 6.1) years of experience as physiotherapists since completing their undergraduate physiotherapy qualifications and a mean of 4.3 (SD = 4.5) years of experience since completing their postgraduate qualifications in sports physiotherapy.

The participants reported working between zero and 70 (mean = 39.4, SD = 13.3) h/wk as treating practitioners and treating sport-related injuries for a mean of 18.1 (SD = 11.0) h/wk. They reported having completed a mean of 19.1 (SD = 16.1) hours of formal education in applied sport psychology during their postgraduate sports physiotherapy training. Of note is that 31 respondents reported that they had not completed any training in this area as part of their postgraduate sports physiotherapy qualification. In addition to undergraduate qualifications in physiotherapy and postgraduate qualifications in sports physiotherapy, 46 participants held other qualifications, the most common of which were bachelor of science (n = 11) and postgraduate diploma in manipulative physiotherapy (n = 9).

There were no significant differences between men and women (when using an alpha level of .05) in terms of age, $t_{148} = -1.3$, $P = .20$; years of experience as physiotherapists, $t_{148} = 0.5$, $P = .60$; years of experience since completing their postgraduate sports physiotherapy course, $t_{148} = 1.7$, $P = .10$; and hours of sport psychology tuition undertaken in their postgraduate sports physiotherapy course, $t_{148} = 1.1$, $P = .30$. Significant gender differences, however, emerged for the number of hours of physiotherapy treatment practiced per week, $t_{148} = 3.6$, $P = .02$, and hours of treatment involving sport-related injuries per week, $t_{148} = 4.3$, $P = .01$; men reported working a greater number of hours per week and treating a greater proportion of sports injuries per week than did women participants.

Test Instruments

The personal data questionnaire used in this study requested information on age, gender, undergraduate and postgraduate qualifications held, and the average number of hours worked as treating practitioners per week. In addition, the questionnaire asked whether a class in sport psychology or a related subject had been completed as part of the sports physiotherapy qualification undertaken by the participant and, if so, the number of hours of tuition included in that subject.

The Wiese et al[5] survey instrument was used in the study to assess sport physiotherapists' views on various issues. For the purpose of this investigation it was called the Sports Physiotherapists' Views on Psychological Strategies (SPVPS) questionnaire. The SPVPS consisted of 3 sections, each requiring item ratings on a 5-point Likert scale (1, not at all important, to 5, very important). In section 1, participants were asked to "rate the importance of the following characteristics or factors in distinguishing athletes who coped most successfully from those who coped least successfully with their injuries" (eg, willingness to listen to physiotherapist, intrinsic motivation). In section 2, the physiotherapists were requested to "rate the effectiveness of the following techniques or strategies for facilitating an athlete's ability to psychologically cope with injury rehabilitation" (eg, athlete's understanding of injury mechanism, visualization). The third section asked, "How important is knowledge about the following strategies for physiotherapists dealing with injured athletes?" (eg, teaching muscular relaxation techniques, reducing depression). Each of the 3 sections also included a blank item for respondents to suggest characteristics or factors that they felt had not been identified or represented in the questionnaire.

In the current study, and in line with Francis et al,[1] minor language changes were made to a number of items on the SPVPS to ensure that it was applicable and comprehensible to Australian sports physiotherapists.

Procedure

The recruitment of participants for this nationwide investigation occurred in 2 ways. First, 115 physiotherapists were mailed surveys via course coordinators from Australian universities offering postgraduate programs in sports physiotherapy. Second, the *Australian Physiotherapy Association's National Private Practitioner's Group 1997–1998 Directory* was used to identify other physiotherapists with postgraduate qualifications in sports physiotherapy, which resulted in 93 more physiotherapists being mailed surveys. Accompanying the surveys was an informational letter and informed consent form. Three weeks after the initial survey was distributed, a follow-up letter and survey were sent to those participants who had not yet replied. It is estimated that approximately 80% of all physiotherapists in Australia with postgraduate qualifications in sports physiotherapy were surveyed. Of the 208 questionnaires initially distributed, 150 were returned,

a response rate of 72.1%. The La Trobe University Faculty of Health Sciences Ethics Committee approved the project, and all participants signed an informed consent form.

Statistical Analyses

The statistical analyses involved 4 phases. First, descriptive statistics were used to show the rank order of means for all items in each of the 3 sections of the SPVPS. Nearly universal behaviors, difficult judgments, and controversial behaviors were calculated from the frequencies of responses for each test item. Second, reliability of the SPVPS was determined using Cronbach's alpha. Third, principal-components analyses were undertaken to assess the factor structure of the 3 sections of the SPVPS. Finally, direct discriminant-function analyses were carried out to look at possible differences in opinions based on experience level and training in applied sport psychology.

Results

Descriptive Statistics

The means and SDs of the physiotherapists' responses to the 3 sections of the SPVPS are shown in Tables 2, 3, and 4.

Table 2 Physiotherapists' Ratings of Characteristics of Athletes Who Cope Well With Injury*

Characteristic	Mean	SD
Willingness to listen to physiotherapist	4.60	0.52
Positive attitude	4.59	0.51
Intrinsic motivation	4.57	0.55
Willingness to learn about the injury and rehabilitation techniques	4.49	0.58
Use of goal setting	4.24	0.58
Determination/Mental toughness	4.22	0.69
High self-esteem/confidence	4.02	0.75
Social support from parents and peers	3.93	0.68
Emotional maturity	3.90	0.70
High pain tolerance	3.06	0.81
High ability level in sport	2.97	0.93
High academic ability	2.76	0.84

*Indicates not at all important, 2 not important, 3 neutral, 4 important, 5 very important.

Table 3 Physiotherapists' Ratings of the Effectiveness of Strategies to Facilitate Psychological Coping With Injury*

Strategy	Mean	SD
Interpersonal communication skills of physiotherapist	4.55	0.50
Realistic time line to full recovery	4.53	0.61
Athlete's understanding of rehabilitation strategy	4.50	0.58
Coach support of athlete	4.39	0.59
Positive reinforcement by physiotherapist	4.37	0.56
Athlete's understanding of injury mechanism	4.33	0.55
Focus on short-term goals	4.30	0.59
Keeping athlete involved with team	4.12	0.71
Encouraging positive self-thoughts	4.09	0.73
Variety of rehabilitation exercises	4.05	0.78
Visualization	3.41	0.84
Relaxation techniques	3.10	0.78

*1 indicates not at all important; 2, not important; 3, neutral; 4, important; 5, very important.

Table 4 Physiotherapists' Ratings of Important Strategies in Treating Injured Athletes*

Strategy	Mean	SD
Setting realistic goals	4.65	0.55
Using a positive and sincere communication style	4.58	0.53
Understanding individual motivation	4.42	0.61
Understanding stress/anxiety	4.35	0.65
Encouraging positive self-thoughts	4.20	0.64
Encouraging self-confidence	4.04	0.66
Reducing depression	3.94	0.63
Enhancing listening skills	3.86	0.74
Teaching concentration skills	3.60	0.72
Teaching use of mental imagery	3.56	0.77
Teaching emotional control strategies	3.51	0.67
Teaching muscular relaxation techniques	3.37	0.74

*1 indicates not at all important; 2, not important; 3, neutral; 4, important; 5, very important.

To further describe the responses of the physiotherapists, nearly universal behaviors, difficult judgments, and controversial behaviors[12,13] were calculated from the frequencies of responses for each test item. A result was defined as a nearly universal behavior or opinion if there was consensus among at least 90% of participants on a particular item.[12,13] In line with the categorization used by Francis et al[7] for the same questionnaire, scores of 1 (not important at all) and 2 (not important) were merged, as were scores of 4 (important) and 5 (very important). There was no item that 90% of the physiotherapists considered to lack importance or effectiveness. In contrast, 16 items were regarded by at least 90% of respondents as important or very important (see Table 5).

When 25% or more of the sample responded neutrally or responded "don't know" or "not sure" to an item, it was regarded as an unsure opinion or a difficult judgment. Table 6 shows the survey items that were marked "neutral" by 25% or more of respondents.

Table 5 Nearly Universal Opinions of the Physiotherapists on Each Section of the SPVPS

Item	Consensus (%)
Section 1	
Positive attitude	99.3
Willingness to listen to physiotherapist	98.6
Willingness to learn about the injury and rehabilitation techniques	97.4
Intrinsic motivation	97.3
Use of goal setting	94.0
Section 2	
Interpersonal communication skills of physiotherapist	100.0
Athlete's understanding of injury mechanism	96.0
Positive reinforcement by physiotherapist	96.0
A realistic time line to full recovery	95.4
Athlete's understanding of rehabilitation strategy	95.3
Focus on short-term goals	94.7
Coach support of athlete	94.7
Section 3	
Encouraging positive self-thoughts	98.0
Setting realistic goals	98.0
Understanding individual motivation	95.3
Understanding stress/anxiety	90.3

Table 6 Unsure Opinions of Physiotherapists on Each Section of the SPVPS

Item	Neutral Response (%)
Section 1	
High pain tolerance	47.3
High ability level in sport	44.7
Section 2	
Relaxation techniques	51.3
Visualization	42.0
Section 3	
Teaching emotional control strategies	49.3
Teaching muscular relaxation techniques	48.0
Teaching concentration skills	40.0

Controversial opinions constituted the items that generated a high variability of responses within the sample. For data measured on a 5-point Likert scale, this was represented by a standard deviation greater than 1.25.[24] No items in this study elicited responses that were controversial.

Reliability

The reliability of the SPVPS was determined using Cronbach's alpha. Good to excellent internal consistency was shown for sections 1 (.68), 2 (.71), and 3 (.85) of the instrument.

Factor Analysis

Principal-components analyses with varimax rotations were used to investigate the factor structure of each section of the SPVPS. Responses from all 150 participants were included in the analyses, giving a participants-to-items ratio of 150:12, well above that recommended by Tabachnick and Fidell[25] for this procedure. Kaiser's criterion (ie, including only factors with eigenvalues greater than 1.0) and Cattell's "scree" test[26] were both used to select appropriate factors. Following the guidelines of Tabachnick and Fidell, a 0.30 cutoff criterion for factor loading was used. Analysis of section 1 of the SPVPS yielded a 4-factor solution. Factor 1, labeled *ability/maturity* (accounting for 23.2% of the variance), was made up of "high academic ability," "emotional maturity," and "high ability level in sport." Factor 2, called *hardiness/esteem* (12.3% of the variance) comprised "determination/mental toughness," "high pain tolerance," and "high self-esteem/confidence." Factor 3, which accounted for a further 9.7% of the variance, was labeled

motivation and contained the items "intrinsic motivation," "positive attitude," and "use of goal setting." Factor 4 (8.6% of the variance) comprised the items "willingness to listen to physiotherapist," "willingness to learn about the injury and rehabilitation," and "social support from parents and peers" and was called *communication/interaction*. Squared multiple correlations and communalities indicated that the factor solution for section 1 of the SPVPS was stable and internally consistent. Primary intercorrelations among the 4 factors showed that no factors correlated highly with each other.

A second principal-components analysis was conducted on section 2 of the SPVPS, and a 3-factor solution emerged. Factor 1 (24.1% of the variance) was termed *education/rehabilitation goals* and consisted of "focus on short term goals," "a realistic timeline to full recovery," "interpersonal communication skills of physiotherapist," "understanding of injury mechanism by athlete," "understanding of rehabilitation strategy by athlete," "positive reinforcement by physiotherapist," and "variety of rehabilitation exercises." The items "visualization," "relaxation techniques," and "encouraging positive self-thoughts" were grouped to form Factor 2 (14.2% of the variance), which was labeled *cognitive skills*. Factor 3 (9.8% of the variance) was named *support* and contained the items "keeping athlete involved with team" and "coach support of athlete." The squared multiple correlations and communalities indicated that the factors in section 2 of the SPVPS were acceptable, and a review of the primary intercorrelations showed that no factors were highly correlated.

Principal-components analysis was performed on section 3 of the SPVPS, with a 2-factor solution emerging. For this section, the number of factors extracted was below that considered reasonable for 12 items.[35] Furthermore, because the 2 factors correlated highly with each other, the factor structure was deemed uninterpretable.

Comparisons Among Subgroups of the Sample

To examine potential differences in opinions based on experience level and formal training in applied sport psychology, direct discriminant-function analyses were carried out. Factor scores (for sections 1 and 2 of the SPVPS) were calculated for each participant, using the method described by Comrey and Lee.[37] That is, scores on each item in the factor were summed, and the total divided by the number of items in the factor. Thus, factor scores ranging from 1 (not at all important) to 5 (very important) were derived. For section 3 of the SPVPS, items were examined independently because of the uninterpretable factor structure. For all comparisons, there were no univariate or multivariate outliers, and when the assumptions of linearity, normality, singularity, multicollinearity, and homogeneity of variance were evaluated, no violation to multivariate analysis was revealed.

Experience-Level Comparisons. For the purpose of comparing responses based on experience level, the physiotherapists were divided into three

"experience" groups. These groups were selected because they divided the sample as evenly as possible. The responses of the physiotherapists with the most experience (ie, more than 14 years, n = 64) were compared with the opinions of those with the least experience (ie, less than 10 years, n = 53). For section 1 of the SPVPS, a nonsignificant discriminant function was derived, $\chi^2_4(N = 117) = 2.5$, $P = .64$. That is, when asked to rate the importance of traits in distinguishing athletes who coped well with injury from athletes who coped less well, experience level of the physiotherapist could not be predicted.

A nonsignificant discriminant function was also obtained for section 2 of the SPVPS, $\chi^2_3(N = 117) = 0.5$, $P = .91$, indicating that physiotherapists with different experience levels did not rate the effectiveness of psychological intervention strategies differently.

For section 3 of the SPVPS (using the 12 items as predictors of experience level), a nonsignificant discriminant function emerged, $\chi^2_{12}(N = 117) = 14.1$, $P = .30$. This indicated that members of both experience-level groups held similar opinions on the importance of physiotherapists' knowledge in various psychological intervention strategies.

Applied Psychology Training Comparisons. Participants were categorized as having had some applied psychology tuition (n = 119) or as having no formal training in applied psychology (n = 31) as part of their postgraduate sports physiotherapy programs. Given the exploratory nature of this study, unequal group sizes were used for comparison because it was thought that in order to demonstrate clearly any attitudinal differences, a clear division between those who had received some training and those who had received no training at all had to be made. For all 3 sections of the SPVPS, nonsignificant discriminant functions were derived: section 1, χ^2_4 (N = 150) = 1.4, $P = .85$; section 2, χ^2_3 (N = 117) = 3.4, $P = .33$; and section 3, χ^2_{12} (N = 150) = 11.6, $P = .48$.

Comments

According to the physiotherapists surveyed, the characteristics that distinguish athletes who cope well with injury and rehabilitation from those who cope less well support previous findings.[1,9,22] Specifically, it was found that an athlete's willingness to listen to the physiotherapist, desire to learn about the injury and rehabilitation, attitude toward rehabilitation, and intrinsic motivation were perceived as important to his or her ability to cope with injury. These characteristics were held as nearly universal opinions (ie, there was more than 90% agreement) by the sample.

A patient's ability to communicate effectively with rehabilitation personnel has been recognized as an important skill for enhancing injury recovery.[18] Communication skills can affect athletes' access to various forms of support and encouragement, both of which are integral to the rehabilitation process.[28] Also, the importance of remaining motivated throughout

rehabilitation has been well documented in the literature.[illegible] Many investigators have proposed that athletes lacking in motivation are less likely to adhere to their treatment programs and are more likely to experience problematic rehabilitation.[illegible] It is therefore important that physiotherapists working with sporting populations be able to identify the personal characteristics that are important for effective psychological adaptation to injury so that they can anticipate and recognize potential emotional problems. Physiotherapists could then coordinate aspects of their rehabilitation to address such problems more quickly. For example, when explaining a rehabilitation program to an injured athlete, the physiotherapist could increase the patient's level of motivation by engendering a more internal locus of control in the athlete (ie, a sense that the athlete has the ability to control the injury's outcome).

In the present investigation and previous research,[illegible] communicating well with the athlete, providing a realistic time line to full recovery, and ensuring that the athlete understands the rehabilitation strategy were reported to be the most effective psychological strategies for facilitating successful rehabilitation. Many investigators[illegible] have argued that therapist communication is the most important element of an effective rehabilitation program because it helps the patient understand his or her injury, treatment expectations, and goals. Ford and Gordon[illegible] reported that athletes described good physiotherapists as those who showed an interest in the athletes, were friendly, were empathic, and listened to their concerns. Furthermore, good communication can help create an environment more conducive to rehabilitation and possibly lead to more positive treatment outcomes.[illegible]

In the current study, the techniques that were viewed as important for physiotherapists to know about were setting realistic goals, using a positive and sincere communication style, and understanding individual motivation. Once again, these findings support those of previous research[illegible] and indicate that physiotherapy training programs should emphasize and teach such psychological strategies.

Participants in the current study reported relaxation exercises and visualization techniques to be the least important strategies for helping athletes cope with the psychological consequences of physical injury. Francis et al[illegible] reported the same finding. Given that stress and anxiety are common reactions to injury[illegible] and that the physiotherapists in the present study rated it important to understand stress/anxiety in their patients, it was unusual that more importance was not placed on strategies aimed directly at reducing these responses. This finding might indicate that physiotherapists do not fully understand the principles and application of these techniques and might explain why these strategies were categorized by the sample as "unsure opinions." An alternative explanation is that the respondents believed that these techniques extended beyond the professional realm of the physiotherapist and should be [illegible]

in the blank items of the SPVPS that knowing when to refer a patient to a sport psychologist was an important skill for physiotherapists to have.

The responses to the SPVPS by physiotherapists with less than 10 years of experience and by their counterparts with more than 14 years of experience were not significantly different. This finding supported that of the only other study to examine differences based on years of experience.[1] Nonetheless, it is possible that significant differences did not emerge because the number of years since qualifying as a physiotherapist is not an appropriate measure of experience. For example, time away from clinical work (eg, for reasons of travel or pregnancy) was not considered in the "experience" definition, despite the marked impact this factor could have had on an individual's experience level. A further explanation for the lack of differences based on experience level could be that all physiotherapists surveyed had at least 4 years of experience since graduating as physiotherapists. This level of experience might have provided even the less experienced participants with enough exposure to the psychological aspects of sports injury for them to give responses similar to those of the more experienced physiotherapists. It would be interesting to assess any differences between recently qualified (ie, less than 4 years) and more experienced practitioners.

The current study found no differences between the responses to the SPVPS of physiotherapists who had undertaken formal tuition in applied sport psychology as part of graduate programs and those who had not. Two explanations could account for the similar responses. First, it is possible that the physiotherapists surveyed developed their views on the psychological aspects of injury through experiential learning, rather than by exposure to strategies in a classroom context. Given that the average experience level of physiotherapists was 13 years, the attitudes and skills developed from clinical exposure might have affected the responses of participants considerably. Also, a review of current undergraduate physiotherapy training programs in Australia showed that most physiotherapists in the study would have completed basic psychology subjects as part of their undergraduate studies. It could be that such training provided respondents with a general appreciation of psychology that could be applied to sport injuries. It is also difficult to interpret this particular finding, because details regarding the type of sport psychology tuition to which respondents had been exposed were unavailable. It is possible that some respondents were taught the more theoretical aspects of sport psychology techniques, whereas others focused on practicing the application of such techniques. As suggested by Gordon et al,[18] further research should focus on assessing the effects of a standardized sport psychology curriculum.

The results of the present investigation must be considered in view of 2 potential limitations. First, the respondents indicated receiving 0–80 hours of tuition in sport psychology as part of their postgraduate sports physiotherapy training, but a review of the current postgraduate sports

physiotherapy curricula throughout Australia indicated that no program provided more than 30 hr of sport psychology tuition. It could be (particularly as the mean number of hours reported by the sample was 19.1) that some physiotherapists responded inaccurately to this question, which would suggest caution in interpreting this finding. A further limitation, as discussed earlier, relates to the comparisons of the number of years of experience. Because there is no clear way to quantify experience in a clinical area, the number of years of practice had to be used. Nonetheless, it is possible for 2 physiotherapists with an equal number of years of experience to have very different levels of experience in dealing with injured athletes.

Conclusion

Notwithstanding the potential limitations discussed previously, the findings of this study contribute to the understanding of sports physiotherapists' views on psychological issues associated with sport injury. In addition to this investigation being the first to examine the reliability and internal structure of the SPVPS, the physiotherapists surveyed highlighted the importance of effective communication skills, understanding motivation, and being able to set realistic goals in rehabilitation. This finding has practical implications for the educators of sports physiotherapists and other sport rehabilitation providers.

Given that physiotherapists have indicated that they would value more training in managing the psychological sequelae of athletic injuries,[9] a possible goal would be to develop a standardized educational framework for sport injury rehabilitation personnel. Such a program could be based on the areas of importance identified by the sports physiotherapists in the current study. Further research efforts might examine the effects of physiotherapists actively implementing basic psychological intervention strategies on the recovery of athletes.[5]

The findings of the current study have established important foundations for future investigations into the use of sport psychology in physiotherapy settings. Having demonstrated that sports physiotherapists acknowledge the place of psychology in athletic injury management, and given the close association of physiotherapists with athletes during rehabilitation, there is further support for physiotherapists to play a more active role in managing some of the basic psychological consequences of sports injuries. It must be emphasized, however, that in circumstances in which more severe psychological difficulties are experienced, physiotherapists should not be expected to administer more specialized interventions, and athletes should be referred to other professionals (eg, sport psychologists). As suggested by Kolt,[9] physiotherapists dealing with athletes should adopt a more holistic approach to injury rehabilitation by incorporating basic

psychological treatment strategies into traditional physiotherapy rehabilitation programs.

Acknowledgments

We would like to thank Elizabeth Henley and Libby Gass for their assistance with the collection of data and Jeremy Adams for his advice on the statistical analyses. We also acknowledge Britton Brewer for his helpful feedback on earlier drafts of this article and Mark Andersen for his advice in the planning stage of the project. Thanks also go to the physiotherapists who gave their time in completing the surveys. This work was completed while the first author was enrolled in, and the second author working in, the School of Physiotherapy at La Trobe University.

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